RESEARCH, DEVELOPMENT & TECHNOLOGY TRANSFER
QUARTERLY PROGRESS REPORT

Wisconsin Department of Transportation
DT1241 8/2010

INSTRUCTIONS:
Research project investigators and/or project managers should complete a quarterly progress report (QPR) for each calendar quarter during which the projects are active.

WisDOT research program category: ☐ Policy research ☒ Wisconsin Highway Research Program ☐ Other ☐ Pooled fund TPF#		Report period year: 2011 ☐ Quarter 1 (Jan 1 – Mar 31) ☐ Quarter 2 (Apr 1 – Jun 30) ☒ Quarter 3 (Jul 1 – Sep 30) ☐ Quarter 4 (Oct 1 – Dec 31)
Project title: Laboratory Study of Concrete Properties to Support Implementation of the New AASHTO Mechanistic-Empirical Pavement Design Guide		
Project investigator: Steve Cramer	Phone: 608-265-2001	E-mail: cramer@engr.wisc.edu
Administrative contact: Peg Lafky	Phone: 608-266-3663	E-mail:
WisDOT contact: Barry Paye/James Parry	Phone:	E-mail:
WisDOT project ID: 0092-11-05	Other project ID:	Project start date: 10/21/2010
Original end date: 10/20/2011	Current end date: 5/3/2012	Number of extensions: 1

Project schedule status:
☐ On schedule ☐ On revised schedule ☐ Ahead of schedule ☒ Behind schedule

Project budget status:

Total Project Budget	Expenditures Current Quarter	Total Expenditures	% Funds Expended	% Work Completed
$102,000.00	$11,491	$58,829.00	58%	82%

Project description:
The strength and durability of concrete paving materials are largely dependent on the curing conditions under which the structure is maintained at an early age. Large scale concrete paving operations present unique challenges that prevent the implementation of curing strategies other than the application of membrane forming curing compounds (MFCCs). The method of action of curing compounds is unknown other than that they prevent evaporation via the formation of a hydrophobic membrane. Curing compounds have a variety of formulations and chemistries that affect the nature of this membrane, its effectiveness at preventing evaporation, and interaction with the curing concrete surface. This situation is further complicated when supplemental cementitious materials (SCMs including slag, fly ash, etc.) are included in the concrete design.
The objectives of this research are to:

1. Evaluate the scaling resistance of concrete materials prepared with several different MFCCs and SCMs.
2. Evaluate the chloride ion penetration resistance of the above materials
3. Evaluate the effectiveness of several MFCCs at preventing evaporation of water from concrete surfaces.
4. Attempt to determine the microstructural consequences of curing concrete pavements with MFCCs.

Progress this quarter (includes meetings, work plan status, contract status, significant progress, etc.):
In this quarter the team focused on: Data analysis and report generation

1. All experimental data for the study has been collected for the required 5 MFCCs (PAMS, Linseed, Wax, chlorinated rubber epoxy, acrylic polymer) and wet room cured concrete.
2. SEM imaging of the surface and interface of concrete specimens prepared using the different curing methods have been taken for all specimens for which it is possible (the wax and linseed based MFCCs exhibited charging under the electron beam)
3. Data analysis, hypothesis generation, and a list of conclusions are being prepared for presentation and inclusion in the final report

An initial draft of the final report is being prepared.

Anticipated work next quarter:
Work next quarter will be focused on finishing the project report and preparing presentation aids required for project completion.

Circumstances affecting project or budget:
Under the revised schedule, the project is on schedule. The gantt chart has been revised.

Insert Gantt chart and other project documentation – attach additional pages if necessary
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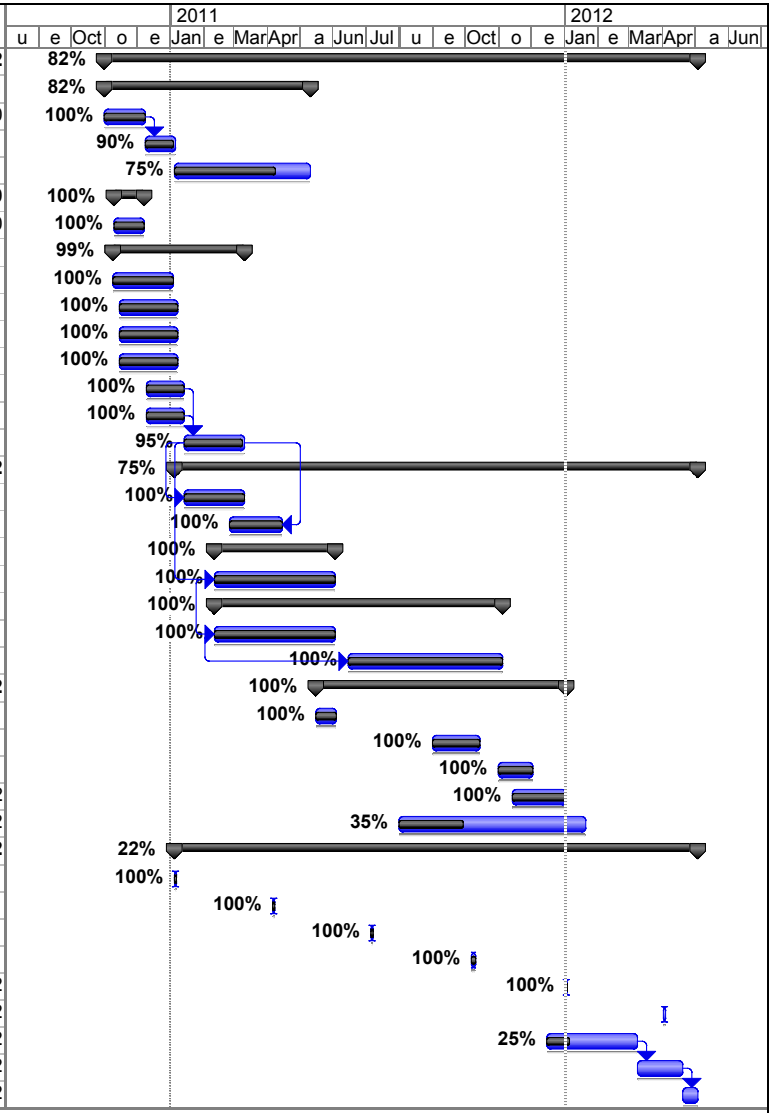
Staff receiving QPR:	Date received:
Staff approving QPR:	Date approved:

ID	Task Name	Duration	Start	Finish
1	**Overall Project Progress**	**394 days**	**Mon 11/1/10**	**Thu 5/3/12**
2	**Literature Review**	**137 days**	**Mon 11/1/10**	**Tue 5/10/11**
3	Review Literature	28 days	Mon 11/1/10	Wed 12/8/10
4	Prepare summary	20 days	Thu 12/9/10	Wed 1/5/11
5	Update literature review as necessary	90 days	Wed 1/5/11	Tue 5/10/11
6	**Research Plan**	**20 days**	**Wed 11/10/10**	**Tue 12/7/10**
7	Finalize testing matrix	20 days	Wed 11/10/10	Tue 12/7/10
8	**Concrete Specimen Preparation**	**88 days**	**Tue 11/9/10**	**Thu 3/10/11**
9	Selection and receipt of aggregates	40 days	Tue 11/9/10	Mon 1/3/11
10	Selection and receipt of cement	40 days	Mon 11/15/10	Fri 1/7/11
11	Selection and receipt of fly ash and slag	40 days	Mon 11/15/10	Fri 1/7/11
12	Selection and receipt of curing compounds	40 days	Mon 11/15/10	Fri 1/7/11
13	Mix material characterization	25 days	Fri 12/10/10	Thu 1/13/11
14	Mold preparation	25 days	Fri 12/10/10	Thu 1/13/11
15	Concrete specimen fabrication	40 days	Fri 1/14/11	Thu 3/10/11
16	**Concrete Specimen Evaluation**	**347 days**	**Wed 1/5/11**	**Thu 5/3/12**
17	Plastic concrete evaluation	40 days	Fri 1/14/11	Thu 3/10/11
18	ASTM C39 testing	35 days	Fri 2/25/11	Thu 4/14/11
19	**ASTM C672 testing**	**80 days**	**Fri 2/11/11**	**Thu 6/2/11**
20	Freeze-thaw testing	80 days	Fri 2/11/11	Thu 6/2/11
21	**ASTM C1543 testing**	**191 days**	**Fri 2/11/11**	**Fri 11/4/11**
22	Ponding/exposure	80 days	Fri 2/11/11	Thu 6/2/11
23	Chloride testing	103 days	Wed 6/15/11	Fri 11/4/11
24	**ASTM C156 testing**	**166 days**	**Mon 5/16/11**	**Mon 1/2/12**
25	Fabricate mortar molds	15 days	Mon 5/16/11	Fri 6/3/11
26	Determine evaporation performance of chamber	32 days	Thu 9/1/11	Fri 10/14/11
27	Prepare mortar specimens	24 days	Tue 11/1/11	Fri 12/2/11
28	Evaluate mortar specimens	36 days	Mon 11/14/11	Mon 1/2/12
29	Data analysis	125 days	Mon 8/1/11	Fri 1/20/12
30	**Reporting**	**347 days**	**Wed 1/5/11**	**Thu 5/3/12**
31	Quarterly report 1	2 days	Wed 1/5/11	Thu 1/6/11
32	Quarterly report 2	2 days	Wed 4/6/11	Thu 4/7/11
33	Quarterly report 3	2 days	Wed 7/6/11	Thu 7/7/11
34	Quarterly report 4	2 days	Fri 10/7/11	Mon 10/10/11
35	Quarterly report 5	2 days	Mon 1/2/12	Tue 1/3/12
36	Quarterly report 6	2 days	Mon 4/2/12	Tue 4/3/12
37	Final report preparation	60 days	Fri 12/16/11	Thu 3/8/12
38	Final report review and revision	30 days	Fri 3/9/12	Thu 4/19/12
39	Final report submission	10 days	Fri 4/20/12	Thu 5/3/12



Project: Curing Compounds 123111
Date: Sun 1/1/12

Task
Split
Progress
Milestone
Summary
Project Summary
External Tasks
External Milestone
Deadline